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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74LV1GT125A

Bus Buffer Gate with 3-state Output



ADE-205-332F (Z)

7th. Edition
Feb. 2003

Description

The HD74LV1GT125A has a bus buffer gate with 3-state output in a 5 pin package. Output is disabled when the associated output enable ($\overline{OE}$) input is high. To ensure the high impedance state during power up or power down, $\overline{OE}$ should be connected to V_{cc} through a pull-down resistor; the minimum value of the resistor is determined by the current sourcing capability of the driver. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

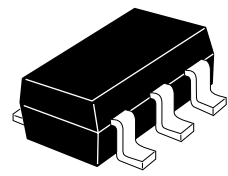
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to $+85^{\circ}\text{C}$
- All inputs V_{IH} (Max.) = 5.5 V (@ $V_{cc} = 0$ V to 5.5 V)
All outputs V_o (Max.) = 5.5 V (@ $V_{cc} = 0$ V, Output : Z)
- Output current ± 12 mA (@ $V_{cc} = 4.5$ V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV1GT125ACME	CMPAK-5 pin	CMPAK-5V	CM	E (3,000 pcs/reel)
HD74LV1GT125AVSE	VSON-5 pin	TNP-5DV	VS	E (3,000 pcs/reel)

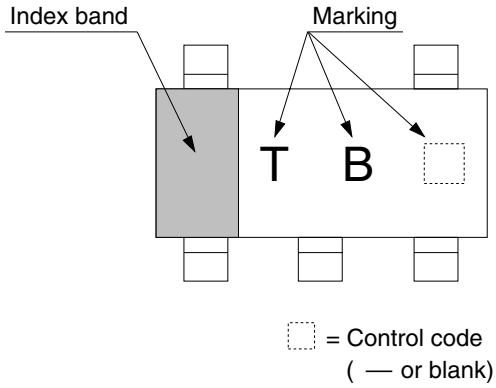
Note: Please consult the sales office for the above package availability.

Outline and Article Indication

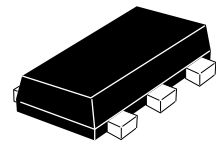
• HD74LV1GT125A



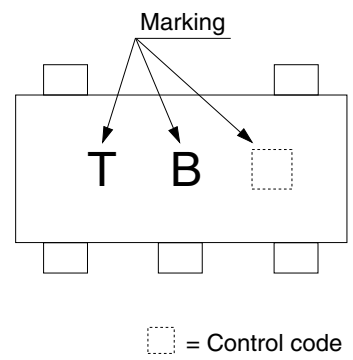
CMPAK-5



• HD74LV1GT125A



VSON-5

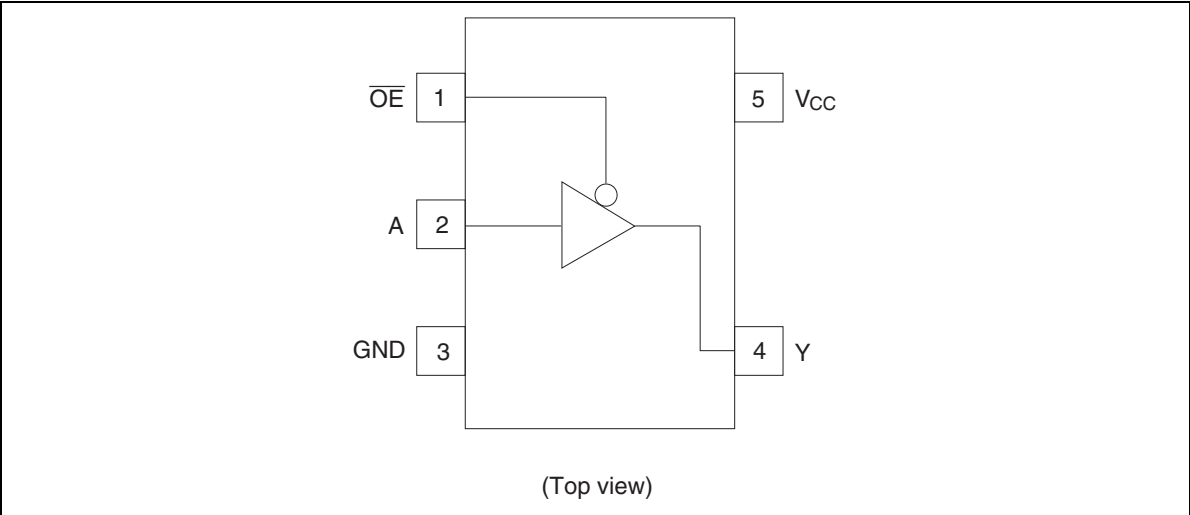


Function Table

Inputs		Output Y
$\overline{OE}$	A	
L	H	H
L	L	L
H	X	Z

H : High level
L : Low level
X : Immaterial
Z : High impedance

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	V_{CC}	−0.5 to 7.0	V	
Input voltage range ^{*1}	V_I	−0.5 to 7.0	V	
Output voltage range ^{*1,2}	V_O	−0.5 to $V_{CC} + 0.5$ −0.5 to 7.0	V	Output : H or L V_{CC} : OFF or Output : Z
Input clamp current	I_{IK}	−20	mA	$V_I < 0$
Output clamp current	I_{OK}	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	±25	mA	$V_O = 0$ to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	±50	mA	
Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) ^{*3}	P_T	200	mW	
Storage temperature	T_{stg}	−65 to 150	$^\circ\text{C}$	

Notes: The absolute maximum ratings are values which must not individually be exceeded, and furthermore no two of which may be realized at the same time.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. This value is limited to 5.5 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	V_{CC}	4.5	5.5	V	
Input voltage range	V_I	0	5.5	V	
Output voltage range	V_O	0	V_{CC} 0 5.5	V	Output : Z
Output current	I_{OH}	—	12	mA	$V_{CC} = 4.5$ to 5.5 V
	I_{OL}	—	−12	mA	$V_{CC} = 4.5$ to 5.5 V
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	$V_{CC} = 4.5$ to 5.5 V
Operating free-air temperature	T_a	−40	85	$^\circ\text{C}$	

Note: Unused or floating inputs must be held high or low.

Electrical Characteristic

- $T_a = -40$ to 85°C

Item	Symbol	V_{CC} (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	V_{IH}	4.5 to 5.5	2.0	—	—	V	
	V_{IL}	4.5 to 5.5	—	—	0.8		
Hysteresis voltage	V_H	5.0	—	0.15	—	V	$V_T^+ - V_T^-$
Output voltage	V_{OH}	Min to Max	$V_{CC} - 0.1$	—	—	V	$I_{OH} = -50\ \mu\text{A}$
		4.5	3.8	—	—		$I_{OH} = -12\ \text{mA}$
	V_{OL}	Min to Max	—	—	0.1		$I_{OL} = 50\ \mu\text{A}$
		4.5	—	—	0.55		$I_{OL} = 12\ \text{mA}$
Input current	I_{IN}	0 to 5.5	—	—	± 1	μA	$V_{IN} = 5.5\ \text{V}$ or GND
Quiescent supply current	I_{CC}	5.5	—	—	10	μA	$V_{IN} = V_{CC}$ or GND, $I_O = 0$
	ΔI_{CC}	5.5	—	—	1.5	mA	One input $V_{IN} = 3.4\ \text{V}$, other input V_{CC} or GND
Output leakage current	I_{OFF}	0	—	—	5	μA	V_{IN} or $V_O = 0$ to $5.5\ \text{V}$
Input capacitance	C_{IN}	5.0	—	3.0	—	pF	$V_{IN} = V_{CC}$ or GND

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

- $V_{CC} = 5.0 \pm 0.5 \text{ V}$

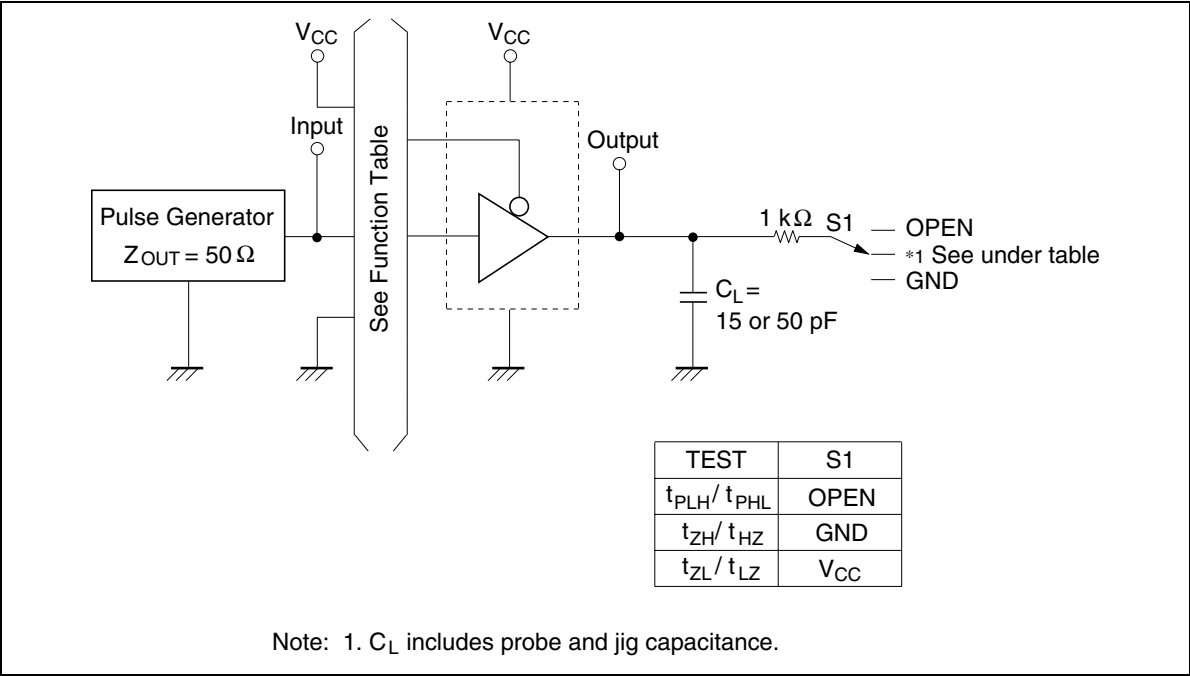
Item	Symbol	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH}	—	3.4	5.5	1.0	6.5	ns	C _L = 15 pF	A	Y
	t _{PHL}	—	4.3	7.5	1.0	8.5		C _L = 50 pF		
Enable time	t _{ZH}	—	3.4	5.1	1.0	6.0	ns	C _L = 15 pF	$\overline{OE}$	Y
	t _{ZL}	—	4.4	7.1	1.0	8.0		C _L = 50 pF		
Disable time	t _{HZ}	—	3.2	6.8	1.0	8.0	ns	C _L = 15 pF	$\overline{OE}$	Y
	t _{LZ}	—	4.0	8.8	1.0	10.0		C _L = 50 pF		

Operating Characteristics

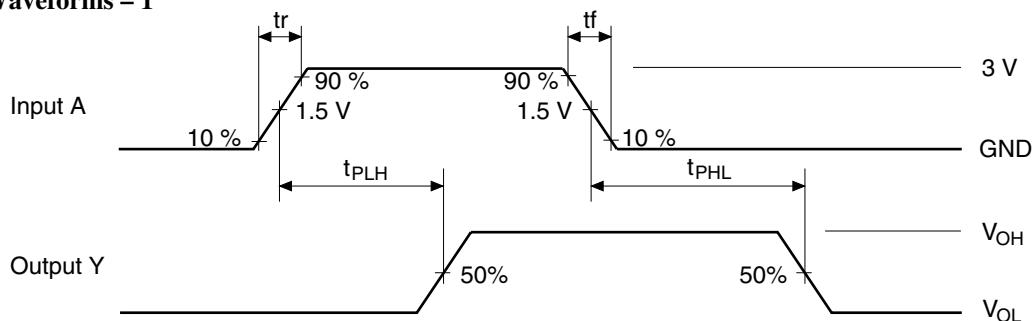
- $C_L = 50 \text{ pF}$

Item	Symbol	V _{CC} (V)	Ta = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	5.0	—	11.5	—	pF	f = 10 MHz

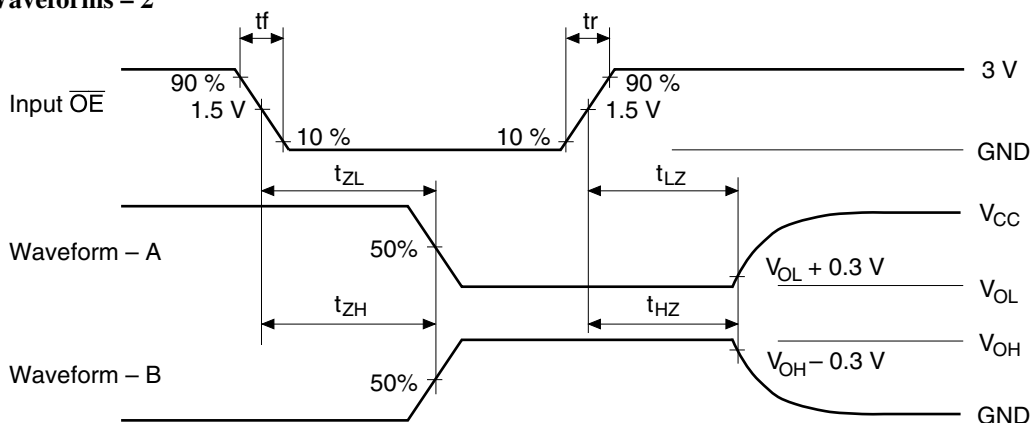
Test Circuit



• Waveforms – 1



• Waveforms – 2



Notes: 1. $t_r \leq 3$ ns, $t_f \leq 3$ ns

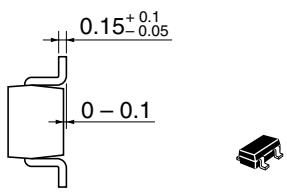
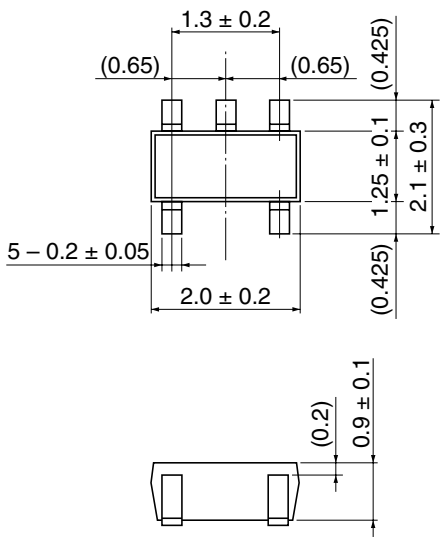
2. Input waveform : PRR ≤ 1 MHz, duty cycle 50%

3. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.

4. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.

Package Dimensions

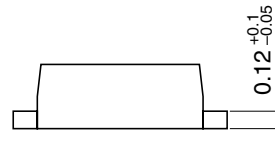
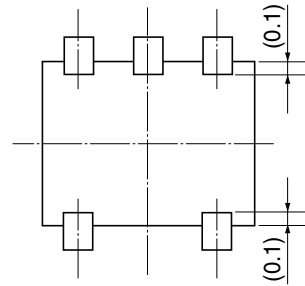
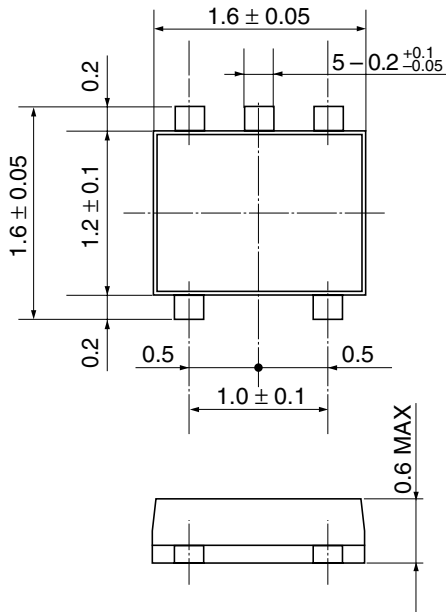
Unit: mm



*Sn-Bi plating

Hitachi Code	CMPAK-5V
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.006 g

Unit: mm



*Sn-Bi plating

Hitachi Code	TNP-5DV
JEDEC	—
JEITA	—
Mass (reference value)	0.002 g

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Sales Offices

HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits
 Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
 Tel: (03) 3270-2111 Fax: (03) 3270-5109

URL <http://www.hitachisemiconductor.com/>

For further information write to:

Hitachi Semiconductor (America) Inc.
 179 East Tasman Drive
 San Jose, CA 95134
 Tel: <1> (408) 433-1990
 Fax: <1> (408) 433-0223

Hitachi Europe Ltd.
 Electronic Components Group
 Whitebrook Park
 Lower Cookham Road
 Maidenhead
 Berkshire SL6 8YA, United Kingdom
 Tel: <44> (1628) 585000
 Fax: <44> (1628) 778322

Hitachi Europe GmbH
 Electronic Components Group
 Dornacher Str 3
 D-85622 Feldkirchen
 Postfach 201, D-85619 Feldkirchen
 Germany
 Tel: <49> (89) 9 9180-0
 Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd.
 Hitachi Tower
 16 Collyer Quay #20-00
 Singapore 049318
 Tel: <65>-6538-6533/6538-8577
 Fax: <65>-6538-6933/6538-3877
 URL: <http://semiconductor.hitachi.com.sg>

Hitachi Asia Ltd.
 (Taipei Branch Office)
 4/F, No. 167, Tun Hwa North Road
 Hung-Kuo Building
 Taipei (105), Taiwan
 Tel: <886>-(2)-2718-3666
 Fax: <886>-(2)-2718-8180
 Telex: 23222 HAS-TP
 URL: <http://semiconductor.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
 Group III (Electronic Components)
 7/F., North Tower
 World Finance Centre,
 Harbour City, Canton Road
 Tsim Sha Tsui, Kowloon Hong Kong
 Tel: <852>-2735-9218
 Fax: <852>-2730-0281
 URL: <http://semiconductor.hitachi.com.hk>

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